



Enabling future-ready LHR strategies with data products

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Section one:

The new LHR opportunity

The concept of data-driven healthcare has been discussed throughout the industry for decades. But, thanks to significant advances in technology, shifts in patient preferences and digital habits, and advanced digital capabilities becoming far more accessible, it's now more than just a vision of the future — it's a reality.

For patients, personalized care and medicine are finally becoming accessible. Digital and remote healthcare services are becoming viable alternatives to face-to-face engagements. And moving between payer, provider, and practitioner touchpoints is faster and more convenient than ever. All thanks to the power of data — and more specifically, how that data is managed, accessed and shared.

Longitudinal Health Records (LHRs) sit right at the heart of these fast, hyperconnected healthcare experiences, services and ecosystems. They provide the input necessary for payers and multidisciplinary care teams to curate personalized Longitudinal Care Journeys for their patients. They've always been an essential element of care delivery and payer services, but now they're playing a pivotal role in some of the most significant shifts happening in the healthcare industry:

The rise of “payviders”

By working together as a single organization or delivering their services within an ecosystem, payers and providers can unlock opportunities for service consolidation, cost-reduction and innovation, all while accelerating care delivery and improving patient outcomes.

But, to realize these benefits, the LHRs those organizations manage must be able to deliver, support and enable the cross-domain use cases and opportunities created by vertical integration.

The evolution of value-based care

To date, payers and providers have struggled to find a standard definition of value to underpin a value-based care model. But, in the wake of the COVID-19 pandemic, both parties are refocusing on the importance of health's social determinants¹ and the need to treat patients holistically.

By integrating multi-dimensional social determinants data with LHRs, every organization involved in a patient's care journey can play a part in improving overall health and can provide personalized care for those who need it most..

The growth of patient-driven healthcare

Despite initially being dismissed by many healthcare organizations as consumer technology with “fancy” features², wearable technology and connected services have empowered patients to capture their healthcare data continuously.

If organizations want to unlock the value held within the data from consumer health tech devices, they must first find ways to integrate the diverse data types they generate with current LHRs.

¹ <https://revcycleintelligence.com/news/payers-providers-need-data-to-talk-value-based-care>

² <https://www.researchandmarkets.com/reports/5230488/global-consumer-wearables-market-2020-2026>

The move towards near real-time clinical interventions and preventative care

With all sources of patient data integrated and connected to a single LHR, organizations can build up a complete view of each patient's health. From there, they can track trends and use predictive analytics to detect issues earlier, and engage patients in need of care proactively instead of waiting for an emergency

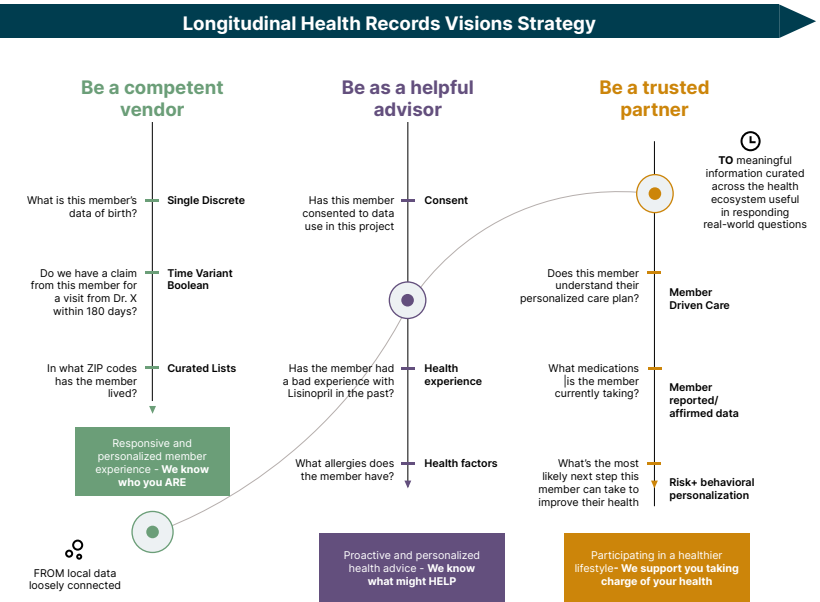
Visualizing the ideal LHR end state

Currently, most healthcare organizations have relatively immature LHR strategies. The LHRs they manage and maintain contain loosely connected data originating from local sources. Because that data is limited, the applications for it are limited too. For example, organizations may know who their patients are and can offer personalized patient experiences based on that, but that personalization doesn't extend into healthcare delivery.

By integrating more data into the LHR and bringing health experience and health factor data into those records — such as experiences with specific drugs, allergen information, and other important, contextualized information about past healthcare interactions — organizations can offer deeply personalized advice and proactive support.

But, that's just a step on their broader journey. The end goal is to bring together a vast range of information curated from experiences across the health ecosystem to respond to questions in real-time. For example, those questions could relate to how well the patient understands their personalized care plan or the next steps to improve patient health proactively.

A mature LHR strategy incorporating data from throughout the healthcare ecosystem enables organizations to become trusted partners for their patients, not just service providers. It equips professionals with the information they need to diagnose or change medications faster, quickly offer alternatives when care choices aren't working, and deliver personalized experiences to improve overall patient health and wellbeing.



Plus, it supports patient-driven care. The depth of patient knowledge enables intuitive and engaging digital healthcare experiences that patients control. They can see reliable recommendations relating to their health, access the right services at the right time and remain engaged with their health at all times — not just when an ailment demands attention. But, to make that a reality, healthcare payers and providers must establish the proper data foundation for LHRs — and several significant challenges stand in their way.

Section two:

The rising challenges of LHR management

The creation of LHRs initially helped payers, providers, and practitioners build a complete view of patient health over time and multiple encounters for a better understanding of their needs. But, as data sources have proliferated and created opportunities for healthcare experiences to continue far beyond the walls of a hospital or clinic, the definition of a “holistic” view has changed.

Over time, personas across healthcare organizations have deployed disparate off-the-shelf Care Management, Provider Engagement, Network Management, and Digital Customer Engagement platforms and capabilities, all designed to meet a different need. Now, various LHR “components” have become trapped within them. These new silos must be unlocked and integrated before a unified model or holistic view can be delivered.

And while the definition of that holistic view has expanded and made holistic visibility harder to achieve, the imperative to create and maintain it has grown significantly. As healthcare services evolve and incorporate data in new ways, a holistic view of patient health data is no longer a “nice to have” that can help providers deliver more targeted care. Now it’s an essential capability that will underpin everything from new insurance and payment models to the delivery of proactive, patient-driven healthcare journeys.

Payers and providers that want to achieve LHR excellence and gain the deepest, broadest, and most practically valuable view of patient health must tackle four main challenges:

1) An explosion in data growth and diversity

According to McKinsey, since 2011, more than \$39 billion has been invested in digital health³. That investment has created a massive range of services, and the deployment of a wide variety of consumer and clinician technology— all built to generate vast volumes of valuable healthcare data.

But, it isn't just growing volumes that are putting pressure on healthcare organizations' systems. As new digital tools and capabilities — from consumer wearables to digital healthcare service platforms — emerge, organizations also have various data sources and formats to manage.

Handling that data is a significant challenge for many organizations. For those whose infrastructure is already stretched to its limits and unable to scale easily, there's far too much data to gather and understand it all effectively.

2) The rising costs of managing and maintaining healthcare data

As data volumes rise, so does the total cost of ownership for that data. To keep up with data growth, organizations throughout the healthcare industry are directing large portions of their digital budgets into maintaining their current big data projects and infrastructure.

³ <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/how-healthcare-services-and-technology-companies-can-boost-productivity-with-data-and-analytics>

Not only does it cost them a lot of money, but it also takes budgets away from realizing the practical value of that data. Quite simply, organizations spend so much money managing and maintaining data and systems that they can't get the total value from them.

3) Fragmented data investments have created higher demand for interoperability

The critical benefit of LHR strategy is its ability to drive multi-domain collaboration on data innovation — helping organizations do things like apply clinical-decision models across scenarios. That demands an open, cross-domain view of data.

Most organizations' current environments, structures and solutions can't provide that visibility across domains. And with the cost of managing healthcare high, many healthcare providers and payers are currently forced to do their best with a limited view of data usage across domains with no domain knowledge attached to data itself.

4) Locked data value and the trapped network effect

The cost of maintaining current LHR data is constraining organizations' ability to invest in data connectivity and sharing — contributing to a “trapped network” effect, where data cannot flow to help create value between domains.

Without free movement of data between domains and a continuous flow of contextualized data moving between LOBs and use cases, the full potential of an LHR strategy cannot be fulfilled.

The core problem: Current data structures and technology aren't up to the task

While developed and deployed to solve specific data challenges, many of the technologies and infrastructures used by payers and providers have created new challenges of their own with significant barriers to effective LHR strategies.

It's especially problematic for organizations like payviders that have grown through acquisition. As they acquire new organizations and expand horizontally, they inherit a mess of systems that are incredibly hard to integrate and interact with one another. The monoliths they face actively block them from realizing the optimizations and collaborative benefits that the acquisition was supposed to deliver.

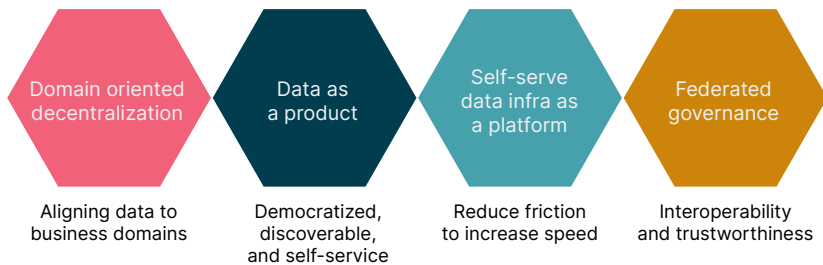
Effective, efficient LHR strategies hinge on the openness and accessibility of data and the systems that store and use health data. If systems and structures limit integration, keep data trapped in distributed silos, or simply cost so much to maintain that the organization has no budget to consider alternative approaches, significant change is needed.

"The LHR-powered world of fast, connected, satisfying, proactive, and deeply personalized healthcare services is entirely new. And it demands a new approach to data management and integration."

Section three: Introducing the data mesh approach to the LHR

Data mesh is a new architectural pattern, offering a decentralized alternative to the data warehouse and data lake structures widely used today. While those structures focus on bringing data together in one place for ease of analysis, a data mesh breaks data down into distinct products, so every team can access and use the data they need, whenever and however they need it.

In an article published in 2019⁴, Zhamak Dehghani, Principal Technology Consultant at ThoughtWorks, laid out the four fundamental principles of the data mesh approach:



These principles showcase why data mesh is emerging as a strong fit for organizations that want to execute mature LHR strategies.

Its domain-oriented nature helps meet the needs of individual teams, while supporting greater data collaboration across the domains. Democratizing data and making it available as

⁴ <https://martinfowler.com/articles/data-monolith-to-mesh.html>

products makes it simple for teams to help themselves to the data they need to improve patient outcomes. Self-service massively cuts the time it takes to turn data into patient and practitioner value. And federated governance ensures that LHRs are built on reliable data and are usable everywhere.

The data mesh approach has surged in popularity over the last couple of years, especially among organizations whose operations depend on the quality and strength of customer-facing, data-driven use cases.

It blends traditional data lake architectures with new best practices to support teams that need rapid access to domain-specific data to do the best job possible.

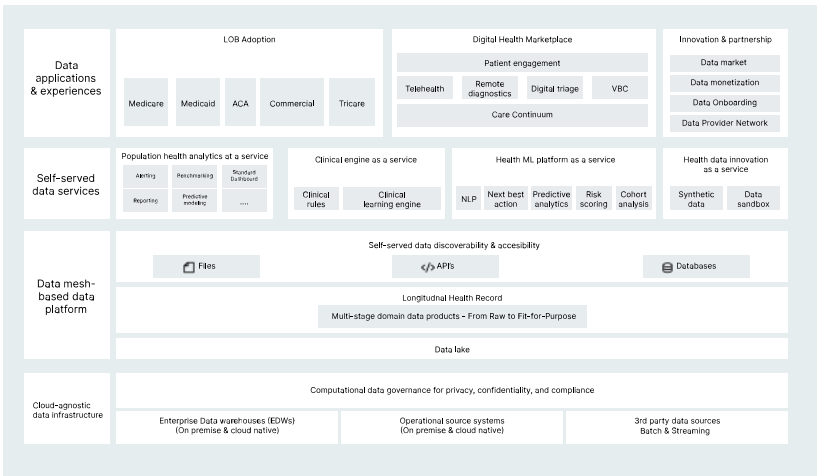
The result is a decentralized data approach that's ideal for supporting fast, future-ready LHR strategies.

“The data mesh provides a foundation to help payers, providers and payviders navigate the challenges of rising data volumes and increasing architectural complexity — while cutting delivery times and assisting teams in building game-changing use cases for holistic patient data.”

Section four: Applying the data mesh in healthcare

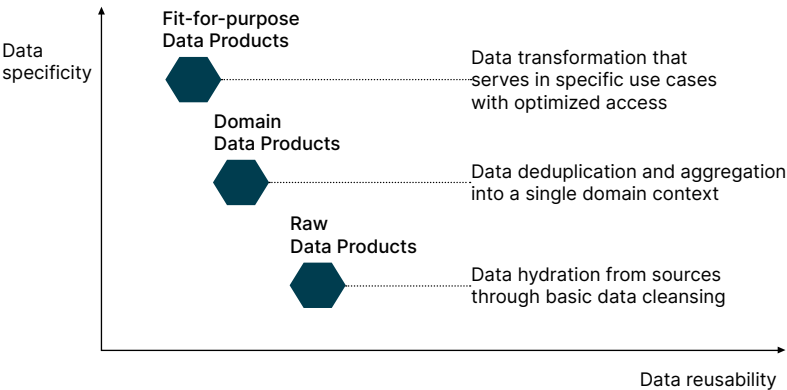
With an ever-growing number of critical data-driven use cases, both internal and patient-facing, organizations in the healthcare industry stand to gain a lot by embracing the data mesh approach.

Here’s a look at how and where the data mesh fits into a healthcare organization’s structures and what it means in practice for your LHR strategy, your future and your patients’ outcomes.



As the diagram above shows, a data platform based on the data mesh approach can sit directly above an existing hybrid data infrastructure. The platform combines data lakes with data products at various stages of completeness, aggregation and contextual richness — from raw data products with high

reusability to contextualized products optimized for a single specific use case.



Techniques like Standardization, harmonization, deduplication, filtering and transformation are applied to create data products across this spectrum of reusability and specificity, each playing their unique role in enabling LHR-driven longitudinal care journeys.

The data mesh layer also provides the foundation for a broad range of self-serve data services, including Machine Learning Platforms as a Service, Analytics Platforms as a Service and Clinical Engines as a Service. Together, these services support the creation of numerous data-driven use cases.

Self-serve data services enable payers, providers and payviders to bring great use cases to life, including advanced analytics that can be applied across the organization, digital health platforms, population health platforms, innovation partnerships and more.

Conclusion:

Data challenges abound in the increasingly digital healthcare industry. The solutions and architectures tasked with tackling those challenges are a big part of the problem for many organizations.

To rise to the new data challenges, consolidate services, enable new efficiencies and deliver a high standard of fast, convenient healthcare experiences, organizations need a robust, future-proven LHR strategy. The data mesh approach supports those strategies perfectly, empowering cross-domain collaborations, helping bring innovative, data-driven use cases to life, and most importantly, delivering better health outcomes to patients.

From enabling personalized and proactive care to improving the speed and efficiency of services, embracing the data mesh can open doors to the future of personalized healthcare care delivery, and to [support the transition to a full Value Based Care model.](#)

To learn more about the data mesh directly from the experts who helped define and shape the approach, speak to Thoughtworks today. Whether you're a payer, provider, or a combination of the two, we have the knowledge, expertise and domain experience to help you strengthen your LHR strategy, overcome the challenges of your existing architecture and lay the foundation for a more efficient future.

About Thoughtworks

Founded over 27 years ago, Thoughtworks has grown from a small team in Chicago to a leading global software consultancy of more than 9000 Thoughtworkers in 43 offices worldwide. At Thoughtworks, we have a holistic approach to ensuring you get the most out of your investments - from legacy modernization to impactful customer experiences - it's all in how we think about value.

Thoughtworks follows a business outcomes-driven, design-led and data-informed approach to building intuitive, game-changing, omni-channel experiences for both our healthcare clients and their customers.

Our expertise includes health/ business model strategy, product innovation, design thinking, experience design, product/data strategy, and digital product evolution extending from the core to the edge of the enterprise.

We've pioneered techniques that harness the power of global teams to deliver software excellence at scale. Our distributed teams across the globe provide access to a broad range of technology capabilities, to help you think big, move fast, and deliver value with the right skills at the right time.

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About the author



Zichuan Xiong

Director of Solutions

Zichuan Xiong is leading Thoughtworks' Healthcare & Lifesciences strategy in North America focusing on helping payers, pharmas, health tech companies succeed in digital health.

Contact us

contact-us@thoughtworks.com

[thoughtworks.com](https://www.thoughtworks.com)

